Shutting down: More firms will move offshore, as shrinking PC prices hurt profit margins

IBISWorld Industry Report 33411a
Computer Manufacturing in the US
June 2013
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Industry Definition

This industry manufactures and assembles personal computers (PCs), laptops and servers. Operators typically purchase computer components (e.g. motherboards and graphics cards) from dedicated manufacturers in other industries (IBISWorld report 33441a, Semiconductor and Circuit Manufacturing). This industry does not include tablet computers, nor does it include manufacturers of computer monitors, mice, keyboards and printers (IBISWorld report 33411b, Computer Peripheral Manufacturing).

Main Activities

The primary activities of this industry are

- Personal computer manufacturing
- Laptop manufacturing
- Desktop manufacturing
- Server manufacturing

The major products and services in this industry are

- Desktop computers
- Portable computers
- Servers

Similar Industries

33411b Computer Peripheral Manufacturing in the US
This industry manufactures computer-related equipment, including monitors, keyboards, mice and printers.

33421 Telecommunication Networking Equipment Manufacturing in the US
This industry manufactures IP-based networking equipment, including routers and network switches.

33441a Semiconductor & Circuit Manufacturing in the US
This industry manufactures semiconductors, memory chips and microprocessors.

33441b Circuit Board & Electronic Component Manufacturing in the US
This industry produces circuit boards, liquid crystal display (LCD) screens and coaxial cables.

44311 Consumer Electronics Stores in the US
This industry sells computers at the retail level.

Additional Resources

For additional information on this industry

www.ccianet.org
Computer & Communications Industry Association

www.bls.gov
US Bureau of Labor Statistics

www.census.gov
US Census Bureau
Industry at a Glance

Computer Manufacturing in 2013

Key Statistics Snapshot

Revenue: $32.8bn
Profit: $1.2bn
Annual Growth 08-13: -7.8%
Annual Growth 13-18: -3.9%
Exports: $6.9bn
Businesses: 342

Market Share
Hewlett-Packard Company: 25.8%
Dell Inc.: 23.3%
Apple Inc.: 21.3%
International Business Machines Corporation: 17.8%
Oracle Corporation: 5.9%

Revenue vs. employment growth

Import penetration into the manufacturing sector

Products and services segmentation (2013)

18% Servers
49% Portable computers
33% Desktop computers

Key External Drivers
Import penetration
Demand from data processing and hosting services
Price of computers and peripheral equipment
Corporate profit
Consumer sentiment index

Industry Structure

Life Cycle Stage: Decline
Revenue Volatility: Medium
Capital Intensity: High
Industry Assistance: Low
Concentration Level: High
Regulation Level: Light
Technology Change: High
Barriers to Entry: Low
Industry Globalization: High
Competition Level: High

For additional statistics and time series see the appendix on page 39.
Industry Performance

Executive Summary

The Computer Manufacturing industry is being rapidly supplanted by imports, particularly from China. While import penetration in this industry stood at 50.1% in 2008, imports are expected to satisfy an estimated 72.8% of domestic demand in 2013. As a result of offshoring by US-based companies and increased competition from international firms, domestic manufacturing activity has declined. Over the five years to 2013, industry revenue is expected to fall at an average annual rate of 7.8% to $32.8 billion. In 2013, revenue is expected to decline an additional 12.3%.

Despite strong demand for computers, US production will continue to plummet

The industry’s woes cannot be blamed on a lack of demand. In fact, the share of US households that own at least one computer increased by 10.2 percentage points from 2008 to 2013. While demand has grown, fierce competition and widespread product homogeneity (the result of computers being assembled from standardized components) have led to falling prices and, consequently, profit margins. Computer and peripheral equipment prices fell at an average rate of 4.6% annually from 2008 to 2013; as a result, personal computer (PC) sales are estimated to generate razor-thin margins of 1.0% in 2013. Meanwhile, the more profitable products sold by this industry, like computers, help bring up the industry’s average profit margin to 3.8% of revenue in 2013.

Further troubles have arisen from Apple’s introduction of a product that has cannibalized its own laptop market. The iPad, which sold three million units in just 80 days after launching in June 2010, proved the tablet computing market’s viability. Due to its enormous success, other companies like Google and Amazon have developed their own tablets, which are gaining popularity. However, all tablets are manufactured abroad, and therefore do not contribute to this domestic industry’s financial performance. Instead, they act as a competitive force to domestically produced computers.

While the emergence of new products and services will boost demand for computers, US manufacturers are not expected to produce the required hardware. Major manufacturers make computers abroad to take advantage of lower labor costs and be close to semiconductor manufacturers, which produce essential computer components. As the levels of standardization and price competition increase, industry revenue and profit margins will continue to come under pressure. Consequently, IBISWorld projects that revenue will fall at an average of 3.9% annually through 2018 to reach $26.8 billion.

Key External Drivers

Import penetration into the manufacturing sector
An increase in import penetration takes away revenue that would otherwise be captured by industry players. Import penetration typically increases when American consumers can purchase cheaper foreign-made goods, such as computers. Computer manufacturing is labor intensive and manufacturers take advantage of cheaper labor abroad, resulting in a high proportion of computers made outside the United States. This driver is expected to increase over 2013, reflecting a serious threat to the industry.
Industry Performance

Key External Drivers continued

Demand from data processing and hosting services
Data processing service providers and data centers in general are major purchasers of computers, particularly servers. When these industries expand, they typically buy more computers. This driver is expected to increase marginally during 2013.

Corporate profit
Corporations are a major customer base for computer manufacturers, particularly for high-end equipment like servers and workstations. Companies need to replace their computers periodically because of the rapid rate of technological change in this industry, but their purchase timing can be significantly affected by corporate profit. When companies lose money or struggle to survive, they often delay investing in their computing infrastructure. This driver is expected to increase during 2013.

Price of computers and peripheral equipment
Computer manufacturers experience lower revenue when retail computer prices fall. These declining prices are largely the result of more efficient manufacturing methods and competition from abroad. As prices continue declining, computer manufacturing will become increasingly standardized and cheaper. This driver is expected to decrease during 2013.

Consumer sentiment index
Consumer confidence plays an important role in the purchase of durable goods. When consumers are confident in the state of the economy, they are more likely to buy durable goods like computers, appliances and vehicles. This driver is expected to increase slightly during 2013, indicating a potential opportunity for the industry.

![Import penetration into the manufacturing sector](SOURCE: WWW.IBISWORLD.COM)

![Price of computers and peripheral equipment](SOURCE: WWW.IBISWORLD.COM)
Industry Performance

Current Performance

During the five years to 2013, fierce competition has made computer manufacturing an increasingly commoditized business. Revenue for the Computer Manufacturing industry is estimated to decline at an average annual rate of 7.8% over the period. In 2013 alone, industry revenue is expected to dive 12.3% to $32.8 billion as import penetration into this industry ramps up.

Despite declining revenue, domestic demand for computers has increased during the past five years, highlighted by the increasing proportion of Americans that own computers. Indeed, PC penetration (the share of US households with at least one PC) has increased from 71.1% in 2008 to 81.3% in 2013. As Americans become more computer-literate, the market for computer-related goods and services grows. This growth, however, is not evident in the performance of domestic manufacturers because of the continued offshoring of manufacturing activities to low-cost countries.

Computer manufacturers have known for years that they are on the path to increasing standardization and vanishing profit. Computer manufacturing is a relatively low profit activity because computers are typically assembled from standardized components. During the five years to 2013, the largest computer manufacturers have diversified their revenue sources away from consumer-oriented computers. Currently, most major players also offer information technology (IT) consulting services, high-end servers and software. This strategy has resulted in a long series of acquisitions, consolidations and sell-offs.

Portable is in

The portable computer segment of this industry has grown markedly during the five years to 2013. In 2013, portables are expected to represent 49.0% of revenue, compared with 40.0% in 2008. Technological advancements in semiconductor manufacturing and heightened production capacity have rapidly brought down the price of portable computers during the five years to 2013, resulting in increased sales at a lower price point. Despite the rise in units sold, the lower prices have caused total industry revenue to decline.

The server computer segment of this industry has also grown during the period, though at a more modest rate. Servers are expected to represent 18.0% of industry revenue in 2013, compared with 14.0% in 2008. Large companies, particularly in the IT services sector, stepped up investment in servers during the recession. Businesses are moving toward cloud computing, where software and computing power is provided over the internet. Cloud computing requires significant investment in servers and data centers (facilities that house many servers). These businesses are taking advantage of the currently low computer prices to upgrade aging internal systems.

Unlike portable computers and servers, the industry’s desktop computer segment has shrunk significantly,
Industry Performance

Portable is in continued

accounting for 33.0% of revenue in 2013 compared with 47.0% in 2008. The falling prices of computer components, their portability and other manufacturing advancements have made laptops more appealing than traditional desktops. Before component prices declined, desktop computers were significantly more powerful and less expensive than their portable alternatives. Currently, mass production of portable computers

The portable computer segment has grown due to technology advancements and lower prices

and components has significantly narrowed the price gap and performance between desktops and portables.

Acquisitions and consolidation

Several industry firms have abandoned PC manufacturing because of falling profit margins and opted to do business in other product lines within the industry. IBM, the company responsible for the original PC design in the 1980s, has long disparaged the PC segment in favor of more lucrative enterprise-oriented products and services. In 2005, the company sold its PC division to China-based Lenovo for $1.8 billion.

Other companies have sought to expand their operations rather than go leaner. In 2011, Hewlett-Packard (HP) acquired Autonomy, Britain’s largest software firm, for about $11.0 billion. Other recent acquisitions by companies in this industry have focused their efforts on enterprise computing and IT services. In January 2010, Oracle Corporation, a database software developer, bought Sun Microsystems, a manufacturer of high-end servers, for $7.4 billion. The deal strengthened Oracle’s hold on the database software market, while giving the firm a foothold in the industry’s expanding server manufacturing segment. In 2009, Dell bought Perot Systems, a major IT services company founded by H. Ross Perot, for $3.9 billion. The acquisition allows Dell to offer end-to-end (i.e. from hardware to support) IT solutions to large companies. HP made a similar move with its purchase of Electronic Data Systems, another IT services company founded by Perot, for $13.9 billion in 2008. The rising mergers and acquisitions (M&A) activity in the industry has forced down the number of firms in the past five years, declining at an average annual rate of 4.0% in the five years to 2013. As smaller domestic manufacturers struggle to maintain a profit, more industry firms will consolidate to take advantage of production efficiency.

Consumer segment suffers

Sales to consumers have generated a larger share of industry revenue in recent years; in 2013, consumer purchases of computers are expected to bring in 19.7% of revenue, compared with 13.6% in 2008. This trend is largely a result of falling computer prices in the five years to 2013. However, manufacturers have been scraping by with 1.0% profit margins for consumer-oriented PCs. Intense price competition and falling production costs have created a “race to the bottom” in the consumer segment.

Computer manufacturers aim to boost profit by courting business and government customers with enterprise-oriented offerings, which typically yield
Industry Performance

Consumer segment suffers continued

profit margins ranging from 6.0% to 9.0% of revenue. Manufacturers can achieve higher margins from these products by bundling IT services with computer sales and through more profitable service systems. Together, the low-margin consumer segment and the high-margin enterprise segment give computer manufacturers an average net profit margin of 3.8%.

Offshoring and outsourcing

The industry delved into offshoring and outsourcing during the five years to 2013, causing the value of imports to increase at an expected average annual rate of 11.7% to $69.1 billion; imports currently satisfy about 72.8% of domestic demand for computers. As a result, the number of US manufacturing plants is anticipated to fall at an annualized rate of 2.8% to 371 in the five years to 2013. High-volume consumer-oriented computer manufacturers have almost entirely shifted production abroad or outsourced it to contract manufacturers. On the other hand, lower-volume and niche computer manufacturers have managed to hang on even as prices plummeted.

Nevertheless, the trend toward offshoring production has resulted in fewer employment opportunities in this industry (which only includes the United States). Employment is expected to remain relatively flat in the five years to 2013, with total wages declining at an annualized rate of 2.7% to $2.5 billion during the period. In 2013, the average worker in this industry is expected to earn an annual wage of $70,328, an increase from $76,904 in 2008.

Industry Outlook

Even with a recovering economy, the Computer Manufacturing industry will not have much to look forward to during the five years to 2018. Revenue is projected to decline at an average annual rate of 3.9% to reach $26.8 billion in 2018. In 2014 alone, IBISWorld anticipates that revenue will diminish a further 7.9%. While considerably fewer computers will be manufactured in the United States, the largest manufacturers will continue to grow their global strength. All major US computer manufacturers produce computers abroad to take advantage of lower labor costs and to be near semiconductor manufacturers, which produce essential computer components. Because only sales of domestically manufactured computers are included in this industry, this trend will plague the industry’s performance.

As computer prices fall, the share of consumers who own computers is anticipated to increase from 81.3% in 2013 to 87.3% in 2018. Growing computer ownership indicates rising demand for computers. This will be supported by improving economic conditions in the coming years. The consumer sentiment index is projected to increase at an average annual rate of 1.8% over the next five years.

Price of computers and peripheral equipment*

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<th>(% change)</th>
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</tr>
<tr>
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<td>54.4</td>
<td>-4.1</td>
</tr>
</tbody>
</table>

*Forecast

SOURCE: BUREAU OF LABOR STATISTICS AND IBISWORLD
Industry Performance

Industry Outlook continued

five years; thus, as the economy recovers from the recession, consumers will be more likely to increase their spending on durable and discretionary goods like computers. Meanwhile, the trade-weighted index is anticipated to fall at an average annual rate of 1.2% over the next five years, driven by the growing money supply and national debt. As a result, computer and peripheral equipment prices are projected to fall at an annualized rate of 3.4% in the five years to 2018, enticing price-conscious consumers to purchase industry products as imports become relatively more expensive. Despite growing demand, average profit margins remain low, due to the industry’s combination of low barriers to entry, which allows for heightened competition, and standardized inputs (i.e. computer components), which makes computers less expensive.

Emerging products and services

The rise of tablet computers, which are excluded from this industry, will continue to pose a significant competitive threat. Apple’s 2010 launch of the iPad, which sold three million units in 80 days, was the first shot in a war to dominate the emerging tablet market. Other manufacturers are challenging Apple by releasing their own competing tablet computers. Not only are tablets exclusively manufactured abroad, but they also perform similar functions as industry laptops, contributing to the decline of already-anemic sales of domestically made products.

Computer server systems, on the other hand, will be a bright spot for this industry in the coming years. The growth of cloud computing (i.e. software and media delivered over the internet) means demand for servers will increase alongside cloud-related technological developments in other industries. For instance, Amazon.com is developing cloud platforms for businesses, while online movie provider Netflix streams video over the internet to consumers’ TVs. More sophisticated and widespread broadband internet connections will also make it possible for businesses to outsource computing tasks to data centers or off-site servers that are managed by a third-party company, such as Amazon.com. Implementing these cloud computing technologies will take substantial and ongoing investment in server computers, data centers and robust internet connections (wired and wireless). Players are preparing for this rising demand from data processing services by investing in their server, storage and IT consulting divisions.

Industry continues shrinking

The increasing standardization of consumer-oriented computer devices, characterized by consistently falling prices and product similarity, will continue to squeeze industry profit. IBISWorld projects that margins will fall from 3.8% in 2013 to 2.8% in 2018. However, major players will likely employ a variety of strategies to boost their profit above the industry average. For example, Apple uses proprietary technology designed for ease of use and strongly defined market segments (e.g. arts-oriented users) to differentiate its products and earn higher margins. Meanwhile, HP, Dell and IBM will expand...
Industry Performance

Industry continues shrinking continued

profit by focusing on enterprise-oriented products and services, like servers and IT consulting, in keeping with its acquisition patterns in recent years.

Nonetheless, employment opportunities within the domestic industry will continue to worsen during the next five years. Industry employment is projected to fall at an annualized rate of 1.1% to 35,700. This decline primarily reflects the continued offshoring of jobs, in addition to improved productivity, driven by cost-savings measures and investments in automotive technology. While the depreciation of the US dollar through 2018 will modestly boost the competitiveness of US-based computer manufacturers, the number of US computer manufacturing plants is projected to fall an average 3.0% annually over the next five years, leaving 288 plants in 2018.
Industry Performance

Computers are becoming increasingly standardized and universal

Industry activity is increasingly concentrated within a few firms

International competitors dominate this industry

Key Features of a Decline Industry
- Revenue grows slower than economy
- Falling company numbers; large firms dominate
- Little technology & process change
- Declining per capita consumption of good
- Stable & clearly segmented products & brands

SOURCE: WWW.IBISWORLD.COM
Industry Performance

Industry Life Cycle

The Computer Manufacturing industry is in the decline phase of its life cycle. The industry’s contribution to the overall economy, measured by industry value added (IVA), is anticipated to fall at an average annual rate of 1.9% from 2008 to 2018, compared with annualized GDP growth of 2.1%. Computers and their underlying technologies, developed by semiconductor manufacturers, grew exponentially more powerful during the past 10 years, and they show no sign of slowing. At the same time, low barriers to entry, falling prices and globalization make the operating environment increasingly unattractive to computers manufacturers in the United States. All of the industry’s major players have manufacturing facilities in Asia. Rising import penetration and foreign production have and will continue to erode domestic computer production.

Although processor speeds, graphics cards, hard drives and other components have improved in their functionality since 2008, there have not been any major breakthroughs in this industry. A relatively stagnant rate of technological change indicates a slowdown of the industry’s life cycle, and a subsequent decline phase.

Computer manufacturers have exited the industry in droves, with the number of firms falling at a 4.0% average annual rate over the five years to 2013, to total 342 companies. The same fierce competition that has driven computer manufacturers out of business has also caused computer prices for consumers to fall. From 2008 to 2013, computer and peripheral equipment prices have declined at an annualized rate of 4.6%, even as computers grew more technologically sophisticated.
Products & Markets

Supply Chain  |  Products & Services  |  Demand Determinants
Major Markets  |  International Trade  |  Business Locations

**Products & Services**

Industry products can be broadly segmented into three categories: desktops, portables and servers. Desktops refer to traditional tower-case personal computers (PCs), which are usually paired with separate nonindustry monitors and keyboards. Portables include laptops and netbooks (smaller and lighter laptops), both of which are gaining popularity among homes and businesses. Portable computers are most easily differentiated by the presence of an integrated monitor. Although firms in this industry design and manufacture tablet computers, the domestic industry does not include these operations because no tablet computers are manufactured in the United States. Servers are enterprise-oriented computers that primarily handle requests in a networked environment. For example, a search for “IBISWorld” on Google.com causes a server in one of Google’s data centers to interpret the query and provide a list of relevant results.
Products & Markets

Portable computers
The portable computer segment of this industry has grown significantly in the past five years. In 2008 portables represented 41.0% of industry revenue; in 2013, they are expected to account for 49.0%. Advances in semiconductor manufacturing and increases in production capacity have brought the price of portable computers down rapidly during the past five years. Five years ago, laptops commonly sold at a $200 to $300 premium over desktops; now they can be purchased for just $50 to $100 more. Similarly, five years ago, entry-level laptops were equipped with processors and graphics cards that were at least a generation older than those available in entry-level desktops. Currently, however, laptops and desktops come with very similar equipment, as semiconductor manufacturers now design their products for use in both types of devices. IBISWorld projects that the portable computer segment will grow rapidly during the next five years, driven by the rising mobile demands of consumers. It is important to note that tablets, including the iPad, are manufactured overseas, and as a result do not contribute to industry revenue.

Servers
The industry’s server computer segment has experienced more modest growth during the five years to 2013. Servers are expected to account for 18.0% of revenue in 2013, compared with 13.0% in 2008. Many large enterprises, particularly in the information technology services sector, have increased their investment in servers in response to the growing trend of cloud computing. Cloud computing allows businesses to access their computer applications and software over the internet from off-site servers managed by third parties. Internet companies like Amazon.com, Google, EMC and others are looking to secure an early foothold in this emerging industry, which requires significant investment in data centers (facilities dedicated to housing many servers). During the five years to 2018, IBISWorld anticipates growth within this segment to be more muted, as developments in cloud computing will eventually lead to more efficient use of existing computing power and less investment in servers to expand capacity.

Desktop computers
The desktop computer segment has declined during the five years to 2013. In 2008, desktop computer sales represented 46.0% of industry revenue; in 2013, that percentage has shrunk to 33.0%. Desksops have become less competitive in recent years, largely as a result of the declining price of laptops. Also, laptop computing capacity has increased to become more comparable to desktops in recent years. Consequently, consumers are finding laptops more appealing than traditional desktops, which lack the advantage of portability. IBISWorld research suggests that desktop computer sales will continue to shrink during the five years to 2013, though niche markets (such as gaming) will persist. In particular, entry-level computers and enthusiast-oriented computers will continue to be desktops because of the lower costs of the former and the upgrade potential of the latter.
Demand Determinants

Demand for new computers is primarily driven by data processing services, technological advancements by upstream semiconductor manufacturers, computer prices, corporate profit and consumer sentiment. Consumers and businesses alike generally replace their computers every three to five years, as extremely rapid and continuous technological innovation by semiconductor manufacturers makes maintaining aging computer systems a relatively poor value compared with newly produced computers. For more than 30 years, Moore’s Law has accurately described developments in computing power: The number of transistors per integrated circuit and processor speed and memory capacity increases exponentially, doubling every two years.

In addition to technological advances, rapidly falling computer prices encourage more consumers to buy new computers. While falling computer prices boost computer sales, they also drive larger shares of computer demand into the hands of foreign computer manufacturers, which benefit from lower production costs. The trade-weighted value of the US dollar against its trading partners strongly influences the share of demand satisfied by domestic manufacturers. The trade-weighted index falls when the value of the US dollar decrease against other currencies, as it has in the past 5 years at an annualized rate of 3.0%. When this happens, US-made goods become relatively cheaper than they were before, and demand increases.

As is the case with most capital goods, corporations are apt to invest in computer systems when their profit is rising. This trend is particularly true when demand for an individual company’s product or service increases. Cash-rich internet companies like Google and Amazon.com are building new data centers (and ramping up their server purchases) as part of their plans to incorporate cloud computing and virtualization technologies into their existing product bases. Virtualization is an emerging technology that allows for real-time adjustments in available storage capacity and computing power, a capability central to cloud computing.

Major Markets

Computer manufacturers sell their products through computer retailers (Computer Stores industry, IBISWorld report 44312,) and directly through websites (E-Commerce and Online Auctions, 45411a). Their customers include small, medium and large businesses, government agencies and consumers. In terms of revenue, the small, medium and large enterprise business segments have declined in importance during the past three years as consumers have started to account for a larger portion of industry sales. From 2008 to 2013, the share of revenue generated from large enterprises and small and medium businesses (SMBs) fell from 25.3% and 21.2%, respectively, to 21.0% and 17.6%. This decline reflects these segments’ sensitivity to economic conditions, particularly corporate profit and consumer spending. When demand for these businesses’ products and services declines, as it did during the recession, companies delay investment in PCs and servers.

Businesses

The large-enterprises and SMB segments are expected to account for a combined 38.6% of industry revenue in 2013, down from about 46.6% in 2008.
During the recession, corporations suffered as consumer spending collapsed. Consequently, many businesses cut back on their investment in replacement PCs and servers. However, the reduced investment in replacement computers is only temporary, as large and small businesses need to replace aging computers eventually. Business users typically keep PCs for an average of three to five years before replacing them. IBISWorld anticipates that these two segments will revive in prominence over 2013.

Individually, larger corporations typically purchase many more computers than smaller businesses, giving larger companies more power to negotiate lower per-unit prices. Furthermore, large enterprises are much more significant buyers of high-end servers, so computer manufacturers are willing to accept lower sales margins. Computer manufacturers offset these cuts by bundling IT consulting services.

**Government agencies**
Sales to government entities are a relative cash cow for computer manufacturers, with this market generating the same profit as small businesses and comparable revenue to the large enterprises segment. Government agencies, from federal bureaus to public schools, represent 20.8% of industry revenue in 2013, up from 19.6% in 2008. While government agencies can certainly match the negotiating power of large enterprises, they typically neglect to do so, resulting in relatively larger profit margins for computer manufacturers. Domestic and foreign government agencies purchase about 40.0% of industry exports.

Demand from government agencies tends to be countercyclical in relation to business demand: government demand grew as the private economy slowed during the recession. Government computer purchases are expected to taper off during 2013, settling back near historical levels as the economy recovers and agencies scale back purchases.

**Consumers**
Sales to consumers have generated a larger share of industry revenue in recent years. In 2013, consumer computer purchases are anticipated to bring in 19.5% of industry revenue, compared with 15.5% in 2008. However, consumer sales are expected to produce razor-thin
International Trade

**Level & Trend**

- **Exports in the industry are Medium and Decreasing**
- **Imports in the industry are High and Increasing**

**Imports**

International trade has increasingly characterized the Computer Manufacturing industry. Imports of computers currently satisfy an estimated 72.8% of domestic demand, compared with 50.1% in 2008. Computer manufacturing is increasingly moving to low-cost production centers in China and elsewhere in Asia. Semiconductor manufacturing has followed a similar pattern. The intimate connection between semiconductors and computers (the former being an input for the latter) encourages colocation of production facilities. In both industries, product design still occurs in the United States, while third-party manufacturers, also known as “fab shops,” handle the actual assembly and production. This process is showing no signs of a reversal. Over the five years to 2013, the total value of imports is projected to increase at an annualized rate of 5.6% to $69.1 billion.

**Exports**

Over the past five years, exports declined at an average annual rate of 6.2% to $6.9 billion in 2013, largely due to competition from overseas manufacturers. Currently, exports represent about 21.1% of industry revenue, up from about 19.4% in 2008. As domestic manufacturers continue to compete with growing competition from overseas manufacturers with lower operating costs, exports as a percentage of revenue is expected to continue to decline. This growth has occurred as US-based manufacturers increasingly shift lower margin production abroad and grow domestically through high-margin products that are in high demand across the globe. Moreover, within the consumer market, US-based computer manufacturers still fare reasonably well, as brand recognition plays a significant role in the purchasing process. In line with this trend, US exports of computers are destined for a diverse array of countries, with more than 60.0% of exports going to countries outside of the top four export destinations (the United Kingdom, Canada, Japan and the United Arab Emirates).
International Trade
continued

Exports To...
- 17% Canada
- 7% Japan
- 6% United Kingdom
- 5% United Arab Emirates
- 65% Other

Imports From...
- 74% China
- 19% Mexico
- 4% Taiwan
- 2% Korea
- 2% All Others
- 2% All Others

Year: 2013
Total $6.9bn
Total $69.1bn

SIZE OF CHARTS DOES NOT REPRESENT ACTUAL DATA
SOURCE: USITC
The Computer Manufacturing industry operates in a highly globalized market, bringing together components that are manufactured worldwide for assembly in a single location. Therefore, the concentration of computer manufacturing facilities near major ports comes as no surprise. With the widespread use of lean-manufacturing protocols, computer manufacturers heavily favor locations that minimize delays in getting products to market, not to mention shipping expenses. However, convenience of shipping is not the only criteria for a successful location.

Computer manufacturing and design also require highly educated employees who are easiest to find in regions with strong engineering schools and are near other computer manufacturers. Furthermore, computer manufacturers work closely with chip designers and software publishers when developing new computer designs, a situation which encourages colocation.

By far, California controls the largest share of activity in the Computer Manufacturing industry, with 26.7% of facilities located within the state generating 29.9% of industry revenue. California’s strength in the industry is largely due to the long-standing cluster of technology companies in Silicon Valley. Texas has the second-highest concentration of computer manufacturing facilities, with 6.6% of the nationwide total, which produce 23.2% of industry revenue. Texas is a prominent technology hub with a long history in computers and semiconductors. The state is home to a number of prominent technology companies, including Dell, the second-largest computer manufacturer; Compaq Computer, now a division of HP; EDS, acquired by HP in 2008; Perot Systems, acquired by Dell in 2009; and Texas Instruments, a major semiconductor manufacturer and one of the firms that initially commercialized PCs.

Massachusetts, the fourth-most prominent state in this industry, attracts 5.3% of industry facilities and generates 4.0% of revenue. Massachusetts’ prominence is primarily due to the strong presence of prestigious universities in the
Business Locations continued

state. It is home to Harvard and the Massachusetts Institute of Technology (MIT), which makes it a prime recruiting ground for computer manufacturers.

While few computer manufacturing firms are headquartered in Massachusetts, many have design and production facilities in the state.
The industry is highly concentrated, with the four largest companies controlling 88.2% of industry revenue. Major players have been aggressive in acquisitions during the past five years, and IBISWorld expects further concentration of industry revenue in the future as these acquisitions continue. Currently, HP and Dell are the largest US-based computer manufacturers. Competition from abroad has tightened profit margins and prices on mass-market computer systems. Consequently, most of the industry’s largest players operate in several related industries to diversify their revenue sources, with a particular emphasis on the highly profitable enterprise segment and information technology (IT) services.

Over the past five years, acquisitions focused on enterprise computing and IT services. For instance, in January 2010, database software developer Oracle bought Sun Microsystems, a manufacturer of high-end servers, for $7.4 billion. The deal strengthened Oracle’s hold on the database software market and gave it a foothold in the expanding server manufacturing segment. In 2009, Dell made a $3.9-billion purchase of Perot Systems, a major IT services company founded by H. Ross Perot. This move allowed the company to offer IT solutions from hardware to support. HP made a similar move in 2008, with its purchase of EDS for $13.9 billion and again in 2011, with its purchase of Autonomy, Britain’s largest software firm.

### Key Success Factors

**Ability to quickly adopt new technology**
Computer manufacturers that can quickly incorporate new technologies from their chip suppliers have a leg up on their competition, particularly in the enthusiast and server markets.

**Effective advertising and branding**
The technical similarity between most computers makes advertising and branding key differentiating factors. Effective advertisers, such as Apple, can achieve stronger growth than their rivals.

**Effective cost controls**
Computer manufacturers face extremely fierce price competition. Failure to implement effective cost controls can quickly reduce market share.

**Strength in export markets**
The majority of growth in computer demand is expected to occur outside the United States. Manufacturers with a strong presence in growing economies will outperform their competitors.

**Offering a “one-stop shop”**
Corporate clients increasingly favor suppliers that can handle all of their IT needs, including PCs, servers, IT support and implementation.
player HP’s domestic manufacturing operating profit margins have ranged from 3.0% to 5.4% during the five years to 2013. Margins reflect profit from US-based computer manufacturing, not related products and services or manufacturing operations abroad.

**Purchases**

The Computer Manufacturing industry primarily assembles computers from finished parts provided by semiconductor suppliers. As an assembly-oriented manufacturing industry, purchases of finished components consume the largest share of industry costs, at an estimated 76.8% in 2013. Changes in the cost of computer components have the strongest effect on industry performance outside of product demand.

The recession significantly affected this industry’s cost structure. In 2007, purchases accounted for about 80.8% of revenue. Slowing consumer spending and increasing semiconductor production capacity accelerated computer price declines. The price of semiconductors, which covers the majority of this industry’s purchase costs, fell by 5.7% in 2008 and a further 1.5% in both 2009 and 2010. During the five years to 2013, computer and peripheral equipment prices fell at an annualized rate of 6.0%, with a sharp 8.6% drop in 2008. Though these falling prices make computers more affordable for consumers, they mean less profit for operators because manufacturing costs remain relatively stable. Manufacturers have responded by reducing their reliance on domestic computer manufacturing, and they are diverting production to less costly overseas factories.

**Wages**

Most design, marketing and research and development (R&D) activities take place outside the manufacturing sector. As such, labor costs are a relatively small share of industry costs.
Competitive Landscape

Cost Structure
Basis of Competition

K

Development (R&D) occur domestically, while most manufacturing is outsourced. This disparity has strengthened in recent years due to offshoring and outsourcing, with the ratio of high-skilled workers to low-skilled workers in America increasing. However, wages are expected to decline at an average annual rate of 2.7% during the five years to 2013 due to sharp declines demand from domestic manufacturers. The relative simplicity of assembly keeps manufacturing abroad, leaving high-skilled workers in this US industry with an average annual income of about $70,238, which is 7.7% of industry revenue.

Competition within the Computer Manufacturing industry is high. Increased competition from foreign competitors has driven down retail prices of PCs since 2008. In the broad consumer-oriented PC market segment, operators are particularly vulnerable to price competition. Subsets of the consumer segment, particularly the gaming audience, offer more opportunities for higher prices, product differentiation and branding. At the same time, sophisticated users limit the potential of this niche by building computers themselves from parts acquired through retail and wholesale channels. Some competitors like Apple command higher prices (earning greater profit) through exclusive product differentiation. Apple computers run their own operating system, OS X, while most other manufacturers sell Windows-equipped computers. IBISWorld expects competition in this industry to increase in the future, as continually falling production costs (specifically in Asia) commodify the key PC market.

Competition within the enterprise-oriented PC and server segments is more nuanced. Large companies often make bulk purchases of PCs from the same brand. Major player Dell is particularly strong within this market, as it has serviced this segment longer than its rivals and is known for aggressive pricing. With corporate customers, offering a breadth of related services is becoming increasingly important. Dell and HP have made a string of acquisitions (see Major Companies section) targeted at IT services and server manufacturers that allow them to offer a “one-stop shop” suite of services to clients.

In the server computer segment, manufacturers are more apt to use alternative operating systems and proprietary technologies. In this segment, customers are more concerned about performance and reliability than ease of use, reducing the need for user-friendly operating systems like Windows and OS X. Corporate IT departments particularly emphasize crash resistance, speed and security. Oracle, a database software developer, recently entered this niche by purchasing Sun Microsystems in January 2010 (see Major Companies section).
Competitive Landscape

Barriers to Entry

The Computer Manufacturing industry has low barriers to entry, with no signs of increasing in the near future. On a small scale, computer assembly is a simple task because of the highly standardized nature of computer components. Computer component manufacturers build their products according to set industry standards, allowing for a wide degree of compatibility with components from other manufacturers. Assembling computers is as simple as snapping in purchased components from upstream suppliers, some of which include Intel and IBM, into appropriate slots within computer cases. Many computer manufacturers, including major players Dell and Apple, began with the founders assembling machines in their garages. The extreme ease of entry makes this industry exceptionally price competitive.

In addition, the market is fragmented allowing for opportunities within niche segments. Serious video game players or competitors typically do not purchase mass produced computers. They usually buy specialized computers with upgraded central processing units for enhanced visual flow and advanced video cards to support intricate graphics.

On an industrial scale, computer manufacturing exhibits some modest barriers to entry. An entrant’s ability to compete relies on the timely supply of products from a limited number of suppliers, which are often plagued by supply shortages. Similarly, new entrants may have difficulty keeping production costs down to compete with large-scale manufacturers, since their bargaining power is limited compared with their larger rivals.

Barriers to Entry checklist

<table>
<thead>
<tr>
<th>Level</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competition</td>
<td>High</td>
</tr>
<tr>
<td>Concentration</td>
<td>High</td>
</tr>
<tr>
<td>Life Cycle Stage</td>
<td>Decline</td>
</tr>
<tr>
<td>Capital Intensity</td>
<td>High</td>
</tr>
<tr>
<td>Technology Change</td>
<td>High</td>
</tr>
<tr>
<td>Regulation &amp; Policy</td>
<td>Light</td>
</tr>
<tr>
<td>Industry Assistance</td>
<td>Low</td>
</tr>
</tbody>
</table>

Level & Trend

Barriers to Entry in this industry are Low and Steady

Industry Globalization

The Computer Manufacturing industry is highly affected by globalization. Computer imports are expected to represent 72.8% of domestic demand in 2013. Supply chains are highly complex, with virtually every American manufacturer assembling computers from imported semiconductors and computer chips. The largest industry companies operate on a global scale, with manufacturing facilities on multiple continents. Currently, foreign ownership of US producers is fairly low.

Globalization and international competition place strong downward pressure on computer prices. Asia-based manufacturers benefit from proximity to semiconductor fabrication facilities and low labor costs, enabling them to offer lower prices (excluding transportation costs). US-based manufacturers have responded to this competition by reducing their reliance on mass-market computer manufacturing and shifting toward the more profitable server and IT consulting markets. IBISWorld expects these trends to continue during the five years to 2018, with industry operators shifting to higher margin activities.
International trade is a major determinant of an industry’s level of globalization. Exports offer growth opportunities for firms. However, there are legal, economic, and political risks associated with dealing in foreign countries. Import competition can bring a greater risk for companies as foreign producers satisfy domestic demand that local firms would otherwise supply.
Headquartered in California, Hewlett-Packard Company (HP) is a globally integrated provider of computers, printers, servers and services. HP offers its products and services to individual consumers, small and medium businesses, large enterprises and government agencies. The company operates in the Computer Manufacturing industry through two segments: enterprise storage and servers, and the personal systems group. Globally, these divisions account for 48.6% of HP’s revenue. In 2013, the US operations of these divisions are expected to represent 7.0% of HP’s global revenue. HP is currently the largest computer manufacturer in the United States, with a 27.3% market share in the domestic industry.

In 2011, HP acquired Autonomy, Britain’s largest software firm, for about $11.0 billion. HP is attempting to enter product segments with higher margins, particularly as sales and profit growth within computer and peripheral product manufacturing have stagnated. Operating profit margin within its US manufacturing operations is estimated to stand at 3.0% in 2012, down from 5.4% in 2007. Historically, the company has shifted production overseas, but thinning margins across the globe have forced it to seek more profitable business ventures, such as the acquisition of Autonomy.

In April 2010, HP acquired Palm to strengthen its position in the expanding portable computers market. Through the acquisition, HP gained access to Palm’s innovative WebOS operating system. With this system, HP entered the tablet market by introducing its TouchPad in July of 2011. However, sales of this device were dismal, as it could not compete with

**Hewlett-Packard Company (US manufacturing segment) – financial performance**

<table>
<thead>
<tr>
<th>Year*</th>
<th>Revenue ($ million)</th>
<th>(% change)</th>
<th>Operating Income ($ million)</th>
<th>(% change)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>587</td>
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<tr>
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<tr>
<td>2010</td>
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<td>2011</td>
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<td>-11.1</td>
<td>-403</td>
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<tr>
<td>2013</td>
<td>8,451</td>
<td>-6.7</td>
<td>-215</td>
<td>-46.7</td>
</tr>
</tbody>
</table>

*Year-end October; **IBISWorld estimates
Major Companies

Player Performance continued

Dell is a global producer of computers, laptops, servers and mobile products. Dell also provides technological infrastructure consulting services. The company pioneered the online direct-sales model for computers, beginning in 1996. At the time, most manufacturers sold their products almost exclusively through traditional wholesale-retail channels. The company organizes its global operations in four business segments: consumer, public, large enterprise, and small and medium businesses. It is the second-largest computer manufacturer in the United States, with a market share of 23.1% in 2013. The company’s US computer manufacturing operations are expected to generate about $7.6 billion in fiscal 2013 (year-end January).

In the five years to 2013, US industry-specific revenue is expected to grow slowly at an annualized rate of 5.2% to $8.5 billion as the company moves more manufacturing operations to countries with lower operating costs. In fiscal 2013, company revenue is projected to decline 0.3%, with a decrease in operating income as computer manufacturers continue to engage in price competition.

Profit margin for the US manufacturing segment is forecast to be negative in fiscal 2013, as the company has been forced to reduce prices in order to remain competitive with other industry firms.

Hewlett-Packard Company – financial performance

<table>
<thead>
<tr>
<th>Year*</th>
<th>Revenue ($ million)</th>
<th>(% change)</th>
<th>Operating Income ($ million)</th>
<th>(% change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
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<td>20.1</td>
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<td>2009</td>
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</tr>
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<td>2012</td>
<td>120,357</td>
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<td>-11,057</td>
<td>N/C</td>
</tr>
<tr>
<td>2013**</td>
<td>119,956</td>
<td>-0.3</td>
<td>9,428</td>
<td>N/C</td>
</tr>
</tbody>
</table>

*Year-end October; **IBISWorld estimate

SOURCE: ANNUAL REPORT AND IBISWORLD

Player Performance

Dell Inc.
Market share: 23.3%

Industry Brand Names
Dell
Alienware
Inspiron
Latitude
OptiPlex
Vostro
Adamo

popular tablet devices, such as the Apple iPad, and it faced hardware problems. As a result, HP plans to wind down device manufacturing and focus its efforts on higher margin products. It may further develop and potentially license its WebOS operating system and expand its IT services and software options to clients.

Financial performance

Over the five years to fiscal 2013 (year-end October), HP’s global sales are expected to achieve annualized revenue growth of 0.3%. The majority of HP’s revenue growth has come from its IT services division, which grew tremendously from 2008 to 2009. This growth has been due to the company’s efforts to expand product offerings and geographic reach with commercial customers and consumers in emerging markets.

In the five years to 2013, US industry-specific revenue is expected to grow slowly at an annualized rate of 5.2% to $8.5 billion as the company moves more manufacturing operations to countries with lower operating costs. In fiscal 2013, company revenue is projected to decline 0.3%, with a decrease in operating income as computer manufacturers continue to engage in price competition. Profit margin for the US manufacturing segment is forecast to be negative in fiscal 2013, as the company has been forced to reduce prices in order to remain competitive with other industry firms.
Dell Inc. (US manufacturing segment) – financial performance**

<table>
<thead>
<tr>
<th>Year*</th>
<th>Revenue ($ million)</th>
<th>(% change)</th>
<th>Operating Income ($ million)</th>
<th>(% change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-08</td>
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<td>0.6</td>
<td>342</td>
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<tr>
<td>2008-09</td>
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<tr>
<td>2009-10</td>
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<tr>
<td>2010-11</td>
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<td>329</td>
<td>16.3</td>
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<tr>
<td>2011-12</td>
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<td>295</td>
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</tr>
<tr>
<td>2012-13</td>
<td>7,580</td>
<td>-3.4</td>
<td>280</td>
<td>-5.1</td>
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</tbody>
</table>

*Year-end January; **IBISWorld estimates

SOURCE: IBISWORLD

completed the acquisitions of Compellent Technologies and SecureWorks, paying $1.5 billion in cash for all the outstanding shares of these companies. Compellent provides virtual storage solutions for enterprise and cloud computing environments. SecureWorks is a global provider of information security services. In September 2009, Dell agreed to buy Perot Systems, an IT services company founded by H. Ross Perot for $3.9 billion. Perot Systems reported $2.8 billion in revenue in 2008. The acquisition expands Dell’s IT consultancy, while offering Perot’s global reach. Although this acquisition strengthened Dell’s revenue, Perot Systems does not contribute to Computer Manufacturing industry revenue.

Similar to other large computer manufacturers, Dell has shifted its strategy toward higher margin products. For instance, Dell is expanding its enterprise solutions and services, which include servers, networking, storage and related services. To achieve growth in this category, Dell expects to leverage its existing customer base, partner with other companies and invest in strategic acquisitions. In addition, Dell seeks to profitably grow its desktop and mobility business and enhance the online buying experience for its customers. The company highlights strategies such as cost-efficiency initiatives, which aim to improve design, supply chain, logistics and operating expenses to adjust to the industry’s changing dynamics.

Dell Inc. – financial performance

<table>
<thead>
<tr>
<th>Year*</th>
<th>Revenue ($ million)</th>
<th>(% change)</th>
<th>Operating Income ($ million)</th>
<th>(% change)</th>
</tr>
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<tbody>
<tr>
<td>2007-08</td>
<td>61,101</td>
<td>-0.1</td>
<td>3,190</td>
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<td>2008-09</td>
<td>52,902</td>
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<td>2009-10</td>
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<td>2010-11</td>
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<td>2011-12</td>
<td>56,940</td>
<td>-8.3</td>
<td>3,012</td>
<td>-32.0</td>
</tr>
<tr>
<td>2012-13**</td>
<td>55,930</td>
<td>-1.8</td>
<td>2,950</td>
<td>-2.1</td>
</tr>
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</table>

*Year-end January; **IBISWorld estimate

SOURCE: ANNUAL REPORT AND IBISWORLD
Apple designs, manufactures and markets personal computers, mobile communication devices and portable media players. The company’s products include the Mac line of desktop and laptop computers, the iPhone smartphone, the iPod line of media players and the iPad tablet computer. Apple’s products are known for their ease of use and proprietary software. Apple was cofounded by Steve Jobs, who died in October 2011. Apple’s products reflect a “walled garden” design philosophy, in which the user experience is carefully managed by Apple. Apple controls about 21.3% of the US Computer Manufacturing industry and is expected to post $7.8 billion of US industry-relevant revenue in fiscal 2013.

Apple’s corporate motto is an apt description for the company’s approach to this industry: “Think Different.” While HP and Dell primarily sell PCs with Microsoft Windows installed, Apple uses its own proprietary operating system, Mac OS X. This setup allows Apple to maintain a high degree of control over what programs can run on its computers. Furthermore, the relatively small number of Macs compared with Windows-based machines makes the platform a less attractive target for malicious viruses and spyware. Apple’s computers have a strong following in artistic professions, and they are increasingly popular with consumers in general. Within the

Apple Inc. (US manufacturing segment) – financial performance**

<table>
<thead>
<tr>
<th>Year*</th>
<th>Revenue ($ million)</th>
<th>(% change)</th>
<th>Operating Income ($ million)</th>
<th>(% change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-08</td>
<td>2,189</td>
<td>53.5</td>
<td>195</td>
<td>69.6</td>
</tr>
<tr>
<td>2008-09</td>
<td>2,463</td>
<td>12.5</td>
<td>135</td>
<td>-30.8</td>
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<tr>
<td>2009-10</td>
<td>3,466</td>
<td>40.7</td>
<td>244</td>
<td>80.7</td>
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<tr>
<td>2010-11</td>
<td>5,412</td>
<td>56.1</td>
<td>422</td>
<td>73.0</td>
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<tr>
<td>2011-12</td>
<td>7,067</td>
<td>30.6</td>
<td>547</td>
<td>29.6</td>
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<tr>
<td>2012-13</td>
<td>7,824</td>
<td>10.7</td>
<td>612</td>
<td>11.9</td>
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</table>

*Year-end September; **IBISWorld estimates

SOURCE: IBISWORLD
**Player Performance**

**IBM** is a global computer, technology and IT consulting business. It developed the original personal computer (PC) architecture, which many other computer manufacturers based their models on in the 1980s. Today, IBM primarily provides software and IT consulting services. The company participates in this industry through its systems and technology division, which sells servers for data centers, network storage solutions and retail point-of-sale computers. IBM is one of a few companies that have pioneered virtualization and cloud computing, representing a paradigm shift in the way that computing power and data centers are managed. About 47.0% of IBM’s total revenue comes from its systems and technology division. The US industry-relevant operations of this division give IBM an estimated market share of 17.7% in 2013.

IBM’s focus on developing leading technologies is reflected in its spending on research and development. As part of this drive, IBM often leads its competitors in identifying and divesting business segments that are diminishing in profit and becoming increasingly standardized. IBM sold its PC division, including the popular ThinkPad line of business laptops, to China-based Lenovo in 2005 for about $1.75 billion. IBM’s decision came as a surprise to many of its competitors, which had not yet felt the impact of declining retail computer prices caused by rising competition and production capacity abroad. Divesting its PC business allowed IBM to focus on more lucrative revenue sources.

**Financial performance**

During the five years to fiscal 2013 (year-end September), Apple’s industry-relevant revenue achieved annualized growth of 29.0%. The company experienced another exceptional year in fiscal 2010, with revenue rising 52.0% due to growing sales of the Macbook Pro and iMac computers. Recent redesigns of Apple’s computer products have made the products increasingly popular with improved processing speed, graphical abilities and other functionalities. Because it uses proprietary technologies, Apple’s operating profit margin has steadily improved during the past five years, from 22.2% in 2008 to 37.4% in 2013.

### Apple Inc. – financial performance

<table>
<thead>
<tr>
<th>Year*</th>
<th>Revenue ($ million)</th>
<th>(% change)</th>
<th>Operating Income ($ million)</th>
<th>(% change)</th>
</tr>
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<tbody>
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<td>56.6</td>
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<td>66.0</td>
<td>33,790</td>
<td>83.8</td>
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<td>2011-12</td>
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<td>55,241</td>
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<tr>
<td>2012-13**</td>
<td>185,332</td>
<td>18.4</td>
<td>69,360</td>
<td>25.6</td>
</tr>
</tbody>
</table>

*Year-end September; **IBISWorld estimate

**SOURCE: ANNUAL REPORT AND IBISWORLD**

**Player Performance continued**

industry, Apple is growing its niche role in the consumer market while maintaining high product prices relative to its competitors.

**Major Companies**
IBM has three series of server systems, which are listed in ascending order of expense. IBM’s System x includes a family of entry-level server computers that are based on the same x86 processors found in PCs. IBM’s System z comprises a series of servers designed for medium and large organizations that need maximum system reliability. Finally, IBM’s System p is a server and workstation series geared for top-of-the-line supercomputers. IBM customers can buy any of these server systems in stand-alone or blade server arrangements. IBM’s IT consultants work with customers to improve computing results by implementing virtualization solutions along with its server systems. This arrangement allows for more efficient use of customers’ existing computing resources.

### Financial performance

During the five years to 2013, IBM’s industry-relevant revenue is expected to decrease at an annualized rate of 4.4%. In 2013, IBISWorld expects IBM’s total revenue to contract by 3.8% to $100.5 billion. Although revenue figures have remained relatively stagnant, the company’s profitability has improved greatly. From 2008 to 2013, IBM’s industry-relevant profit margin is expected to increase from 3.6% to 4.2%. These positive results can be attributed to IBM’s focus on growing value-added revenue sources, exemplified by its exit from PC manufacturing in 2005 and

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**IBM (US manufacturing segment) – financial performance**

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue ($ million)</th>
<th>(% change)</th>
<th>Net Income ($ million)</th>
<th>(% change)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>259</td>
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</tr>
<tr>
<td>2009</td>
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<td>2012</td>
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</tr>
<tr>
<td>2013*</td>
<td>5,790</td>
<td>-2.1</td>
<td>245</td>
<td>-5.8</td>
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*IBISWorld estimates

**IBM – financial performance**

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue ($ million)</th>
<th>(% change)</th>
<th>Net Income ($ million)</th>
<th>(% change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
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</tr>
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<tr>
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<td>99,870</td>
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<td>14,834</td>
<td>10.5</td>
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<td>2011</td>
<td>106,916</td>
<td>7.1</td>
<td>15,855</td>
<td>6.9</td>
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<tr>
<td>2012</td>
<td>104,500</td>
<td>-2.3</td>
<td>15,244</td>
<td>-3.9</td>
</tr>
<tr>
<td>2013*</td>
<td>100,500</td>
<td>-3.8</td>
<td>14,590</td>
<td>-4.3</td>
</tr>
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</table>

*IBISWorld estimate
Oracle Corporation is the third-largest software firm in the world behind Microsoft and IBM. Based in Redwood Shores, CA, Oracle focuses its software publishing efforts on the large-enterprise market. Oracle’s main types of enterprise software include Oracle Database, enterprise resource planning, customer relationship management and supply chain management. Oracle became a competitor in the Computer Manufacturing industry when it purchased Sun Microsystems in August 2009 for $7.4 billion (the transaction closed in January 2010). Sun Microsystems was a prominent developer of open source software (most notably Java and its Solaris Unix-based server operating system) and manufacturer of proprietary servers. Sun’s server and database products were regarded for their exceptional speed and performance, owing to Solaris’ tightly integrated servers and components. IBISWorld estimates that Oracle’s market share in this industry is 5.2%.

Sun Microsystems
Before being acquired by Oracle, Sun was based in Silicon Valley, CA, and had manufacturing capacities in California, Oregon and Scotland. The company was a leading worldwide provider of products, services and support solutions for building and maintaining network computing environments. Sun contributed scalable computer and storage systems, high-speed microprocessors and a comprehensive line of high-performance software for operating network computing equipment. Sun also provided a range of services, including support, professional services and education. Sun’s products were used for many commercial and technical applications in various industries, including telecommunications, financial services, manufacturing, government, education and research, retail, healthcare, digital media and entertainment. It made some major acquisitions of its own, mainly in the software space, before Oracle acquired it. In February 2008, Sun

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**Oracle Corporation (US manufacturing segment) – financial performance**

<table>
<thead>
<tr>
<th>Year*</th>
<th>Revenue ($ million)</th>
<th>(% change)</th>
<th>Operating Income ($ million)</th>
<th>(% change)</th>
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<tbody>
<tr>
<td>2007-08</td>
<td>1,041</td>
<td>21.9</td>
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<td>2010-11</td>
<td>1,515</td>
<td>23.0</td>
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<tr>
<td>2011-12</td>
<td>1,890</td>
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<td>11.3</td>
</tr>
<tr>
<td>2012-13</td>
<td>1,920</td>
<td>1.6</td>
<td>131</td>
<td>2.3</td>
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</table>

*Year end May; **IBISWorld estimates

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continued focus on the more profitable server segment. Since selling off its PC manufacturing business, IBM has funneled its resources into IT consulting, enterprise software and cutting-edge server systems.
Major Companies

Player Performance continued

acquired MySQL, a Sweden-based provider of open source and proprietary database technology and software and services, for about $904.0 million.

Oracle’s financial performance
Oracle’s US industry operations have grown since fiscal 2008, posting annualized revenue growth of 13.0% to $1.9 billion. Oracle’s industry-relevant operating profit margins have slimmed down from their 9.6% peak in fiscal 2008 (year-end May) to an estimated 6.8% in fiscal 2013. However, Oracle’s business is primarily software-based; therefore, it is less comparable to other computer manufacturers as it will naturally have a higher operating profit margin. Fitting this distinction, purchases consume only 21.5% of Oracle’s total company revenue, compared with the industry average of more than 76.0%.

<table>
<thead>
<tr>
<th>Year*</th>
<th>Revenue ($ million)</th>
<th>(% change)</th>
<th>Operating Income ($ million)</th>
<th>(% change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-08</td>
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<td>24.6</td>
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<td>2012-13**</td>
<td>39,581</td>
<td>6.6</td>
<td>14,899</td>
<td>8.7</td>
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</tbody>
</table>

*Year end May; **IBISWorld estimate

SOURCE: ANNUAL REPORT AND IBISWORLD

Other Companies

Other major global computer manufacturers compete within the US market, such as Sony, Toshiba and Acer. Nevertheless, these firms are not considered major players in the Computer Manufacturing industry because most of their production activities occur abroad, so the computer products they sell to US customers are imported.

The remaining companies in this industry are small operators with less than 5.0% market share. These companies operate in niches where larger companies are less effective, particularly in the market for customized gaming-oriented computers and computers used for high-end video rendering. Barriers to entry are low, so it is easy for new companies to ramp up and compete, even if they are competing with low production volumes. Computer components are widely available at computer stores and online electronics retailers, which allows consumers to assemble their own computers.
Capital Intensity

The Computer Manufacturing industry has a high level of capital intensity. While manufacturers only spend slightly more on employees’ wages than on ongoing capital expenses, both expenditures are very minor cost components for operators; this industry is highly capital intensive in relative terms, but the absolute level of investment is low. An estimated $0.57 is allocated toward capital expenses for every dollar spent on labor. Workers in an assembly line process typically do computer assembly manually, while automation is technically feasible, the cost savings would be minor. Computer manufacturers do not actually produce computer components (see IBISWorld report 33441a Semiconductor and Circuit Manufacturing), which is the most capital-intensive activity in the supply chain. As concentration increases, IBISWorld expects some manufacturers will invest in heavily automated assembly processes.

Tools of the Trade: Growth Strategies for Success

New Age Economy
Recreation, Personal Services, Health and Education. Firms benefit from personal wealth so stable macroeconomic conditions are imperative. Brand awareness and niche labor skills are key to product differentiation.

Investment Economy
Information, Communications, Mining, Finance and Real Estate. To increase revenue firms need superior debt management, a stable macroeconomic environment and a sound investment plan.

Old Economy
Agriculture and Manufacturing. Traded goods can be produced using cheap labor abroad. To expand firms must merge or acquire others to exploit economies of scale, or specialize in niche, high-value products.

Traditional Service Economy
Wholesale and Retail. Reliant on labor rather than capital to sell goods. Functions cannot be outsourced therefore firms must use new technology or improve staff training to increase revenue growth.

Change in Share of the Economy
Operating Conditions

Technology & Systems

Computer manufacturers deal with extremely rapid technological change. Chip manufacturers (such as Intel, AMD and Nvidia) release new components every six months on average. Because of this short product life cycle, the retail value of these components depreciates very quickly. Computer manufacturers mitigate this risk by keeping lean inventories and planning for rapid inventory turnover. Technological innovation by computer manufacturers themselves is generally minimal, though they may spend funds to develop cases and form factors that are differentiated from their rivals’ offerings. During the past 10 years, computer manufacturers shifted their sales focus to direct-online sales, a strategy pioneered by Dell. Before the direct-sales model became the norm, most computer manufacturers sold their products through retail and wholesale channels in bulk. This sales model was a poor fit for computers because of the rapidly depreciating value of components and lack of customization. Direct sales methods allow manufacturers to offer lower prices, retain lower inventory and precisely meet the needs of a diverse array of consumers.

Revenue Volatility

The Computer Manufacturing industry exhibits a moderate level of revenue volatility, averaging a year-over-year fluctuation of 6.1% during the five years to 2013. High competition and low barriers to entry place downward pressure on computer prices, limiting revenue gains in periods of high demand. In such a competitive market, manufacturers that try to charge higher prices when demand is high will quickly lose market share to competitors that offer similar products for less. Consumer sentiment’s influence over industry revenue is declining in importance as prices fall. Today, consumers can easily purchase an entry-level computer for $300. At the same time, few electronics or other durable goods can offer the versatile combination of entertainment and practicality that computers offer, making computers a good value for consumers. These traits moderate revenue volatility during recessionary periods, when consumer sentiment is weakest. On average, consumers replace their computers every three to five years.

The business-oriented segment of computer demand is a much more significant source of revenue volatility. For most businesses, computer purchases are capital expenditures. As is the case with most capital expenditures, businesses often delay replacing aging computers when corporate profit is thin. When businesses experience rising profit and demand, they will replace their computers. In the server market, some businesses (especially in the telecommunications and information sectors) are more inclined to buy new servers ahead of an increase in demand. Companies that need reliable and fast access to their networks, whether internally or externally, are willing to pay a premium to ensure server capacity is sufficient. Insufficient server capacity can result in network failure, bringing down services for all users. Companies that highly value the reliability of their services will invest heavily in servers in anticipation of potential spikes in usage. IBISWorld expects that the uniqueness of server investment patterns will fade during the five years to 2018, as more widespread use of virtualization allows companies to rent server capacity from other server owners.
Operating Conditions

Revenue Volatility continued

A higher level of revenue volatility implies greater industry risk. Volatility can negatively affect long-term strategic decisions, such as the time frame for capital investment. When a firm makes poor investment decisions it may face underutilized capacity if demand suddenly falls, or capacity constraints if it rises quickly.

Revenue Volatility vs Growth

Volatility vs Growth

<table>
<thead>
<tr>
<th>Volatility (%)</th>
<th>Five year annualized revenue growth (%)</th>
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<tbody>
<tr>
<td>1,000</td>
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<tr>
<td>100</td>
<td>Stagnant</td>
</tr>
<tr>
<td>10</td>
<td>Blue Chip</td>
</tr>
<tr>
<td>1</td>
<td>Rollercoaster</td>
</tr>
<tr>
<td>0.1</td>
<td></td>
</tr>
</tbody>
</table>

* Axis is in logarithmic scale

SOURCE: WWW.IBISWORLD.COM

Regulation & Policy

In practice, computer manufacturers face minimal regulatory intervention. However, several regulatory bodies have nominal oversight of industry activities. As with other electronics manufacturers, computer manufacturers must comply with radio frequency emissions standards put forth by the US Federal Communications Commission, certifying that computers do not emit a problematic level of radio waves that may interfere with other broadcasts.

Along with most other businesses, computer manufacturers face antitrust regulations from the Federal Trade Commission and the Department of Justice. The US Consumer Product Safety Commission enforces product safety requirements. The regulatory activities of these bodies rarely have significant effects on the operations of computer manufacturers, since the relevant regulations rarely change.

The Association for Computing Machinery assists the Computer Manufacturing industry in various ways, with inexpensive membership offerings in varying forms. The association provides conferences, career resources and publications to its members.

Industry Assistance

The Computer Manufacturing industry does not receive any consistent support from US government agencies. On rare occasions, state and local governments offer tax incentives to entice manufacturers to locate production facilities within their jurisdiction. Computer manufacturers and related business groups have formed many advocacy groups and industry associations to influence public policies and support industry competitiveness.

The Information Technology Association of America (ITAA) provides global public policy, business networking and national leadership to encourage growth of the IT industry. ITAA consists of more than 500 corporate members throughout the country and a global network of 41 countries’ IT associations.

The Electronic Industries Alliance (ETA) is a national trade organization that includes US manufacturers. The
Operating Conditions

ETA is a partnership of electronic and high-tech associations and companies that aims to promote the market development and competitiveness of the US high-tech industry through domestic and international policy efforts.
Key Statistics

### Industry Data

<table>
<thead>
<tr>
<th>Economy Rank</th>
<th>Sector Rank</th>
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<tr>
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<td>76/404</td>
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<td>161/404</td>
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<td>584/1252</td>
<td>97/404</td>
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<td>51/433</td>
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<tr>
<td>7/434</td>
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<tr>
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#### Annual Change

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<tr>
<th>Revenue ($m)</th>
<th>Industry Value Added ($m)</th>
<th>Establishments</th>
<th>Enterprises</th>
<th>Employment</th>
<th>Exports ($m)</th>
<th>Imports ($m)</th>
<th>Wages ($m)</th>
<th>Domestic Demand ($m)</th>
<th>Price of Computers and Peripheral Equipment (Index)</th>
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<td>7,690.0</td>
<td>40,046.0</td>
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#### Key Ratios

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<tr>
<th>IVA/Revenue (%)</th>
<th>Imports/Demand (%)</th>
<th>Exports/Revenue (%)</th>
<th>Revenue per Employee ($000)</th>
<th>Wages/Revenue (%)</th>
<th>Employees per Est.</th>
<th>Average Wage ($)</th>
<th>Share of the Economy (%)</th>
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<td>23.46</td>
<td>794.34</td>
<td>9.50</td>
<td>106.15</td>
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</table>

**Sector Rank**

| 3734/404       | 31/374           | 147/374          | 52/404         | 364/404        | 61/404          | 67/404           | 76/404          |

**Economy Rank**

| 1108/1252      | 33/433           | 165/433          | 133/1252       | 1071/1252      | 102/1251        | 239/1252         | 429/1252        |

**Note:** Figures are inflation-adjusted 2013 dollars. Rank refers to 2013 data.

SOURCE: WWW.IBISWORLD.COM
Jargon & Glossary

**Industry Jargon**

**CLOUD COMPUTING** Web-based processing that provides resources, software and information to computers and other devices on demand over the internet.

**OPEN SOURCE** A licensing system that makes software source code available to the public to use, or develop further, at no charge.

**SMARTPHONE** A mobile phone that offers advanced PC-like capabilities.

**TABLET PC** A portable computer with a touch screen as the primary input device.

**VIRTUALIZATION** Emerging technology that allows one computer to easily use the resources of another over a network connection.

**IBISWorld Glossary**

**BARRIERS TO ENTRY** High barriers to entry mean that new companies struggle to enter an industry, while low barriers mean it is easy for new companies to enter an industry.

**CAPITAL INTENSITY** Compares the amount of money spent on capital (plant, machinery and equipment) with that spent on labor. IBISWorld uses the ratio of depreciation to wages as a proxy for capital intensity. High capital intensity is more than $0.333 of capital to $1 of labor; medium is $0.125 to $0.333 of capital to $1 of labor; low is less than $0.125 of capital for every $1 of labor.

**CONSTANT PRICES** The dollar figures in the Key Statistics table, including forecasts, are adjusted for inflation using the current year (i.e. year published) as the base year. This removes the impact of changes in the purchasing power of the dollar, leaving only the “real” growth or decline in industry metrics. The inflation adjustments in IBISWorld’s reports are made using the US Bureau of Economic Analysis’ implicit GDP price deflator.

**DOMESTIC DEMAND** Spending on industry goods and services within the United States, regardless of their country of origin. It is derived by adding imports to industry revenue, and then subtracting exports.

**EMPLOYMENT** The number of permanent, part-time, temporary and seasonal employees, working proprietors, partners, managers and executives within the industry.

**ENTERPRISE** A division that is separately managed and keeps management accounts. Each enterprise consists of one or more establishments that are under common ownership or control.

**ESTABLISHMENT** The smallest type of accounting unit within an enterprise, an establishment is a single physical location where business is conducted or where services or industrial operations are performed. Multiple establishments under common control make up an enterprise.

**EXPORTS** Total value of industry goods and services sold by US companies to customers abroad.

**IMPORTS** Total value of industry goods and services brought in from foreign countries to be sold in the United States.

**INDUSTRY CONCENTRATION** An indicator of the dominance of the top four players in an industry. Concentration is considered high if the top players account for more than 70% of industry revenue. Medium is 40% to 70% of industry revenue. Low is less than 40%.

**INDUSTRY REVENUE** The total sales of industry goods and services (exclusive of excise and sales tax); subsidies on production; all other operating income from outside the firm (such as commission income, repair and service income, and rent, leasing and hiring income); and capital work done by rental or lease. Receipts from interest royalties, dividends and the sale of fixed tangible assets are excluded.

**INDUSTRY VALUE ADDED (IVA)** The market value of goods and services produced by the industry minus the cost of goods and services used in production. IVA is also described as the industry’s contribution to GDP, or profit plus wages and depreciation.

**INTERNATIONAL TRADE** The level of international trade is determined by ratios of exports to revenue and imports to domestic demand. For exports/revenue: low is less than 5%, medium is 5% to 20%, and high is more than 20%. Imports/domestic demand: low is less than 5%, medium is 5% to 35%, and high is more than 35%.

**LIFE CYCLE** All industries go through periods of growth, maturity and decline. IBISWorld determines an industry’s life cycle by considering its growth rate (measured by IVA) compared with GDP; the growth rate of the number of establishments; the amount of change the industry’s products are undergoing; the rate of technological change; and the level of customer acceptance of industry products and services.

**NONEMPLOYING ESTABLISHMENT** Businesses with no paid employment or payroll, also known as nonemployers. These are mostly set up by self-employed individuals.

**PROFIT** IBISWorld uses earnings before interest and tax (EBIT) as an indicator of a company’s profitability. It is calculated as revenue minus expenses, excluding interest and tax.
Jargon & Glossary

VOLATILITY The level of volatility is determined by averaging the absolute change in revenue in each of the past five years. Volatility levels: very high is more than ±20%; high volatility is ±10% to ±20%; moderate volatility is ±3% to ±10%; and low volatility is less than ±3%.

WAGES The gross total wages and salaries of all employees in the industry. The cost of benefits is also included in this figure.
At IBISWorld we know that industry intelligence is more than assembling facts
It is combining data with analysis to answer the questions that successful businesses ask

Identify high growth, emerging & shrinking markets
Arm yourself with the latest industry intelligence
Assess competitive threats from existing & new entrants
Benchmark your performance against the competition
Make speedy market-ready, profit-maximizing decisions

Who is IBISWorld?
We are strategists, analysts, researchers, and marketers. We provide answers to information-hungry, time-poor businesses. Our goal is to provide real world answers that matter to your business in our 700 US industry reports. When tough strategic, budget, sales and marketing decisions need to be made, our suite of Industry and Risk intelligence products give you deeply-researched answers quickly.

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